

I claim:

1. A method of fabricating a laminate article, comprising the steps of:
 - 5 providing a plurality of support templates;
arranging the support template to define a part outline
corresponding to the laminate article;
providing at least one primary panel defining an outer surface and
an inner surface;
 - 10 securing the outer surface of the at least one primary panel to the
plurality of templates;
arranging at least one secondary panel on the inner surface of the
primary panel in a desired relationship with the primary
panel;
 - 15 securing a vacuum bag to the at least one primary panel to define a
vacuum chamber; and
applying a vacuum to the vacuum chamber to remove air from
between the at least one primary panel and the at least one
secondary panel.
- 20 2. A method as recited in claim 1, in which:
the step of providing at least one primary panel comprises the step
of providing a plurality of primary panels; and
the step of securing the outer surface of the at least one primary
25 panel to the plurality of support templates comprises the step
of securing the outer surfaces of the primary panels to the
plurality of support templates to define a primary layer of the
laminate article.
- 30 3. A method as recited in claim 2, in which at least two of the

primary panels abut each other to define an edge joint, the method further comprising the step of sealing the edge joint.

4. A method as recited in claim 1, in which the at least one
5 primary panel is a first skin panel, where the step of arranging the at least one secondary panel on the inner surface of at least one primary panel comprises the steps of:

providing at least one core panel defining first and second surfaces;
arranging the first surface of the at least one core panel against the
10 inner surface of the at least one primary panel;
providing at least one second skin panel defining an inner surface
and an outer surface; and
arranging the inner surface of the at least one second skin panel
against the second surface of the at least one core panel.

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5. A method as recited in claim 2, in which the plurality of
primary panels are first skin panels, where the step of arranging the at
least one secondary panel on the inner surface of the plurality of primary
panel comprises the steps of:

20 providing a plurality of core panels each defining first and second
surfaces;
arranging the first surfaces of the core panels against the inner
surfaces of the primary panels;
providing a plurality of second skin panels each defining an inner
25 surface and an outer surface; and
arranging the inner surfaces of the second skin panels against the
second surfaces of the core panels.

6. A method as recited in claim 1, in which the step of arranging
30 at least one secondary panel on the inner surface of the primary panel in a

desired relationship with the primary panel comprises the steps of:
securing at least one locator peg to the primary panel; and
forming at least one locator hole in the at least one secondary
panel; and

5 displacing the at least one secondary panel such that the at least
one locator hole receives a corresponding locator peg.

7. A method as recited in claim 4, in which the step of arranging
the plurality of secondary panels on the inner surface of the primary panel
10 in a desired relationship with the primary panel comprises the steps of:
securing at least one locator peg to the primary panel; and
forming at least one locator hole in the at least one core panel;
forming at least one locator hole in the at least one second skin
panel; and
15 displacing the at least one core panel and the at least one second
skin panel such that the locator holes therein receive a
corresponding locator peg.

8. A method as recited in claim 6, further comprising the step of
20 forming bleeder holes in the at least one secondary panel.

9. A method as recited in claim 7, further comprising the step of
forming bleeder holes in the at least one core panel and the at least one
second skin panel.

25 10. A method as recited in claim 4, further comprising the steps
of:
forming channels between the at least one core panel and the first
and second skin panels; and
30 causing resin to flow through the channels.

11. A method of fabricating laminate articles, comprising the steps of:

5 providing at least one primary layer defining an inner surface;
providing at least one locator peg;
securing the at least one locator peg to the primary layer;
providing at least one secondary layer;
forming at least one locator hole in the secondary layer;
displacing the secondary layer relative to the primary layer such
10 that the at least one locator peg enters the at least one
locator hole;
applying a vacuum to the primary layer and the secondary layer
such that
air is withdrawn from between the primary layer and the
15 secondary layer, and
hardenable material is dispersed between the primary layer
and the secondary layer.

12. A method as recited in claim 11, in which:

20 the step of providing at least one secondary layer comprises the
steps of
providing a plurality of secondary layers; and
forming at least one locator hole in each of the plurality of
secondary layers;
25 the step of displacing the at least one secondary layer relative to
the primary layer further comprises the steps of displacing
the plurality of secondary layers relative to the at least one
primary layer such that the at least one locator peg enters
the at least one locator hole formed in each of the plurality of
30 secondary layers; whereby

the vacuum withdraws air from between the primary layer the
plurality of secondary layers, and
the vacuum disperses the hardenable material between the primary
layer the plurality of secondary layers.

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13. A method as recited in claim 12, in which at least one of the
plurality of secondary layers is arranged at least partly between the
primary layer and another of the secondary layers.

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14. A method as recited in claim 11, in which:
the step of providing at least one secondary panel comprises the
steps of
providing first and second secondary panels; and
forming at least one locator hole in each of the first and

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second secondary panels;
the step of displacing the at least one secondary panel relative to
the primary panel further comprises the steps of displacing
the first and second secondary panels relative to the primary
panel such that the at least one locator peg enters the at
least one locator hole formed in each of the first and second
secondary panels; whereby

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the vacuum withdraws air from between the primary panel and the
first secondary panel and between the first secondary panel
and the second secondary panel, and

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the vacuum disperses the hardenable material between the primary
panel and the first secondary panel and between the first
secondary panel and the second secondary panel.

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15. A method as recited in claim 14, in which:
the primary panel is a fiberglass panel;

the first secondary panel is a core panel; and
the second secondary panel is a fiberglass panel.

16. A method as recited in claim 11, in which:
- 5 the step of providing the at least one locator peg comprises the
step of providing a plurality of locator pegs;
the step of securing the at least one locator peg to the primary
panel comprises the step of securing the plurality of locator
pegs to the primary panel;
- 10 the step of providing at least one secondary panel comprises the
steps of
providing a plurality of secondary panels; and
forming at least one locator hole in each of the plurality of
secondary panels;
- 15 the step of displacing the at least one secondary panel relative to
the primary panel further comprises the steps of displacing
the plurality of secondary panels relative to the primary panel
such that one locator peg enters the at least one locator hole
formed in each of the plurality of secondary panels.

- 20 17. A method as recited in claim 16, in which at least two of the
plurality of secondary panels are in contact with the primary panel and
define a secondary panel juncture.

- 25 18. A method as recited in claim 11, in which:
at least two primary panels are provided; and
the at least two primary panels define at least one primary edge
juncture.

- 30 19. A method as recited in claim 18, further comprising the step

of sealing the primary edge juncture.

20. A method as recited in claim 11, in which:
at least two secondary panels are provided; and
5 the at least two secondary panels define a secondary edge
 junction.

21. A method as recited in claim 19, in which:
at least two secondary panels are provided; and
10 the at least two secondary panels define a secondary edge
 junction.

22. A method as recited in claim 11, in which:
at least two secondary panels are provided; and
15 the at least two secondary panels define a secondary face juncture.

23. A method as recited in claim 11, further comprising the steps
of:
providing a support structure defining a part outline; and
20 supporting the at least one primary panel on the support structure
 to form an outer skin that substantially follows the part
 outline.

24. A method as recited in claim 11, in which the step of
25 providing the support structure comprises the steps of:
 providing a plurality of template members; and
 arranging the template members in a template array.

25. A method as recited in claim 11, in which:
30 at least two primary panels are provided;

at least two secondary panels of a first type are provided;
at least two secondary panels of a second type are provided;
the at least two primary panels are arranged to define an outer skin
layer;

5 the at least two secondary panels of the first type are arranged to
define core layer;
the at least two secondary panels of the second type are arranged
to define an inner skin layer, where the core layer is
arranged between the outer skin layer and the inner skin
10 layer.

26. A method as recited in claim 25, further comprising the steps
of:

15 providing a release sheet; and
arranging the release sheet on the inner skin layer.

27. A method as recited in claim 26, further comprising the steps
of:

20 providing at least one bleeder sheet; and
arranging the at least one bleeder sheet on the at least one release
sheet.

28. A method as recited in claim 27, further comprising the steps
of:

25 providing at least one breather sheet; and
arranging the at least one breather sheet on the outermost release
sheet.

29. A method as recited in claim 11, further comprising the step
30 of:

forming a plurality of bleeder holes in the secondary panel; where
the step of applying a vacuum between the primary panel and the
secondary panel further comprises the steps of withdrawing
air from the bleeder holes and forcing hardenable material
into the bleeder holes.

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30. A method as recited in claim 25, further comprising the step
of:

forming a plurality of bleeder holes in the secondary panels forming
the core layer and the inner skin layer; where
the step of applying a vacuum between the primary panel and the
secondary panel further comprises the steps of withdrawing
air from the bleeder holes and forcing hardenable material
into the bleeder holes.

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31. A method as recited in claim 30, in which the at least one
locator peg is secured to the inner surface of the primary panel such that
the bleeder holes in the secondary panels forming the core layer and inner
skin layer are substantially aligned.

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32. A method as recited in claim 31, further comprising the steps
of:

providing a release sheet;
forming a plurality of bleeder holes in the release sheet; and
arranging the release sheet on the inner skin layer such that the
bleeder holes in the release sheet are substantially aligned
with the bleeder holes in the inner skin layer.

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33. A method as recited in claim 11, further comprising the step
of applying hardenable material to the inner surface of the at least one

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primary panel.

34. A method as recited in claim 11, further comprising the step
of introducing hardenable material between the primary panel and the at
5 least one secondary panel.

35. A method as recited in claim 11, in which the step of
applying a vacuum between the primary panel and the secondary panel
comprises the steps of:
10 providing a vacuum bag; and
sealing the vacuum bag to at least one of the primary panel and the
secondary panel to prevent air outside the vacuum bag from
flowing between the primary panel and the secondary panel.

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